FIG. 1

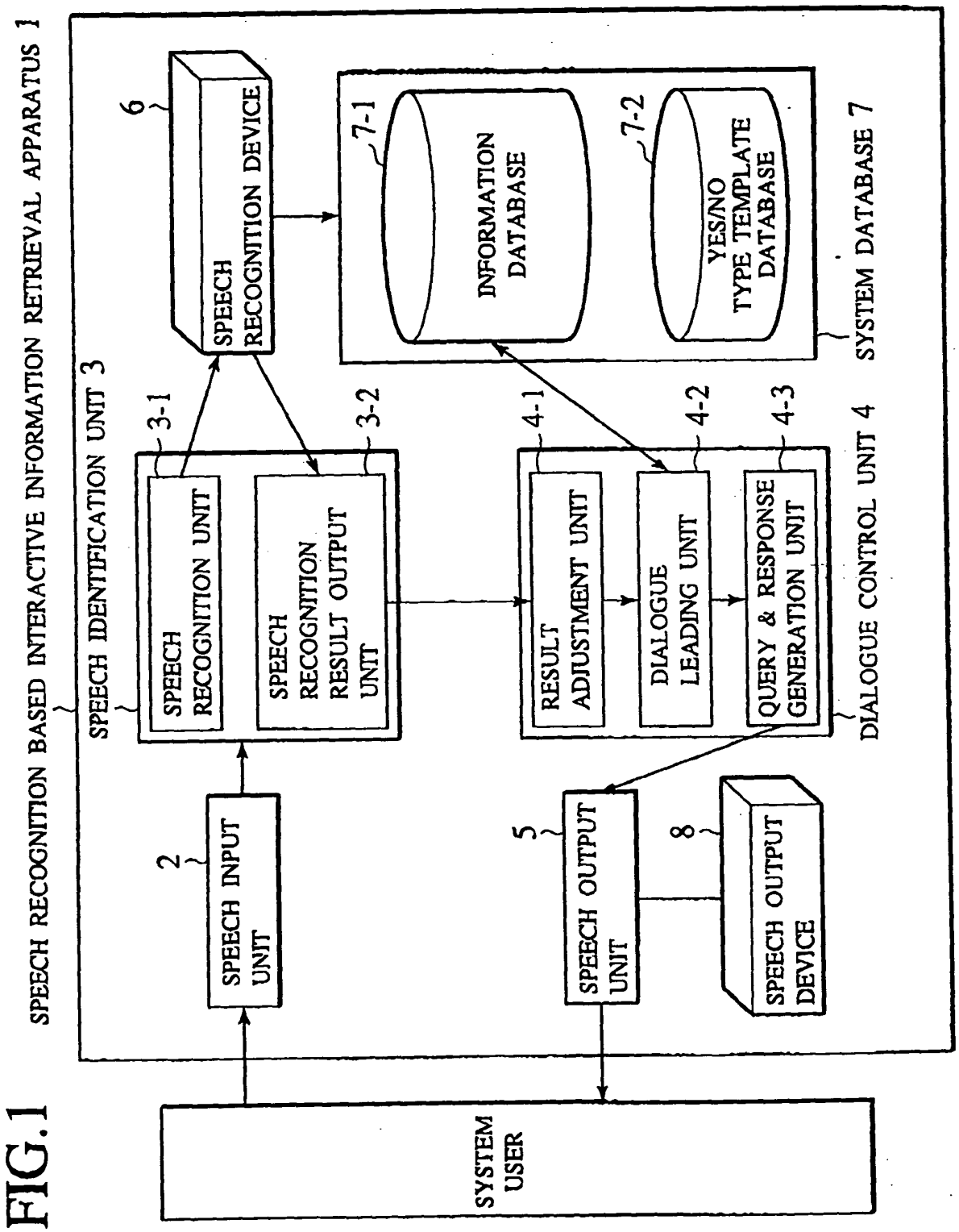

SPEECH RECOGNITION BASED INTERACTIVE INFORMATION RETRIEVAL APPARATUS 1
SPEECH IDENTIFICATION UNIT 3
3-1
SPEECH RECOGNITION UNIT
3-2
SPEECH RECOGNITION RESULT OUTPUT UNIT
6
SPEECH RECOGNITION DEVICE
DIALOGUE CONTROL UNIT 4
4-1
RESULT ADJUSTMENT UNIT
4-2
DIALOGUE LEADING UNIT
4-3
QUERY & RESPONSE GENERATION UNIT
SYSTEM DATABASE 7
7-1
INFORMATION DATABASE
7-2
YES/NO TYPE TEMPLATE DATABASE
2
SPEECH INPUT UNIT
5
SPEECH OUTPUT UNIT
8
SPEECH OUTPUT DEVICE
SYSTEM USER

FIG.2

ATTRIBUTE VALUES OF ATTRIBUTE #1	ATTRIBUTE VALUES OF ATTRIBUTE #2	---	ATTRIBUTE VALUES OF ATTRIBUTE # α
ATTRIBUTE VALUE #1_1	ATTRIBUTE VALUE #2_1	---	ATTRIBUTE VALUE # α_1
ATTRIBUTE VALUE #1_1	ATTRIBUTE VALUE #2_1	---	ATTRIBUTE VALUE # α_2
ATTRIBUTE VALUE #1_1	--	---	ATTRIBUTE VALUE # α_3
ATTRIBUTE VALUE #1_1	ATTRIBUTE VALUE #2_1	---	ATTRIBUTE VALUE # α_4
--	ATTRIBUTE VALUE #2_2	---	--
--	--	---	--
--	ATTRIBUTE VALUE #2_3	---	--
ATTRIBUTE VALUE #1_1	--	---	--
ATTRIBUTE VALUE #1_2	ATTRIBUTE VALUE #2_i	---	--
ATTRIBUTE VALUE #1_2	--	---	--
--	ATTRIBUTE VALUE #2_j	---	--
--	--	---	--
ATTRIBUTE VALUE #1_2	--	---	--
ATTRIBUTE VALUE #1_3	ATTRIBUTE VALUE #2_l	---	--
--	--	---	--
ATTRIBUTE VALUE #1_3	--	---	--
--	--	---	--
--	--	---	--
--	--	---	--
--	--	---	--
ATTRIBUTE VALUE #1_n	--	---	--
ATTRIBUTE VALUE #1_n	--	---	--
--	ATTRIBUTE VALUE #2_p	---	--
ATTRIBUTE VALUE #1_n	ATTRIBUTE VALUE #2_p	---	ATTRIBUTE VALUE # α_z

FIG.3

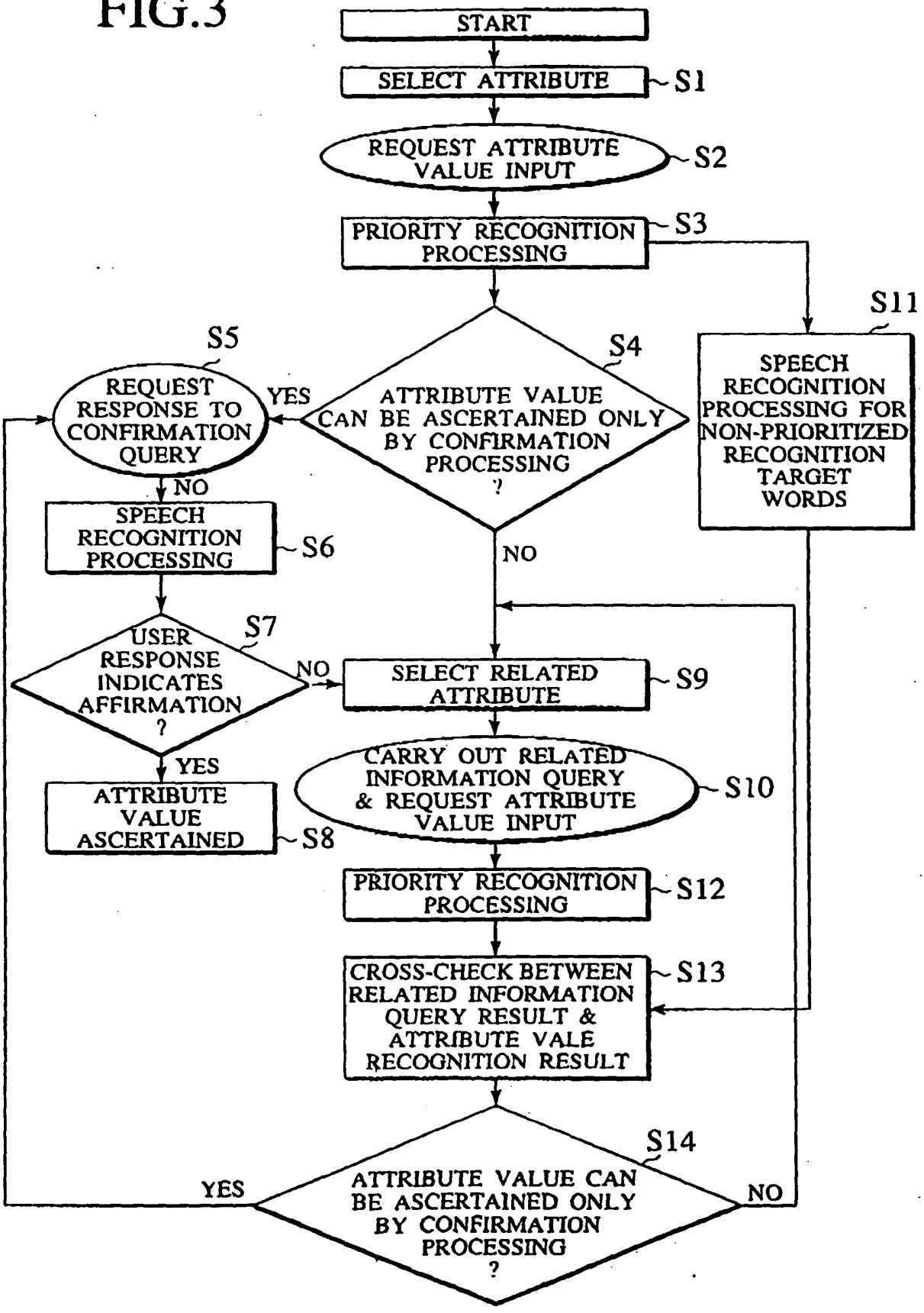

START
SELECT ATTRIBUTE
S1
REQUEST ATTRIBUTE VALUE INPUT
S2
PRIORITY RECOGNITION PROCESSING
S3
S11
S5
S4
REQUEST RESPONSE TO CONFIRMATION QUERY
YES
ATTRIBUTE VALUE CAN BE ASCERTAINED ONLY BY CONFIRMATION PROCESSING ?
SPEECH RECOGNITION PROCESSING FOR NON-PRIORITIZED RECOGNITION TARGET WORDS
NO
SPEECH RECOGNITION PROCESSING
S6
NO
S7
USER RESPONSE INDICATES AFFIRMATION ?
NO
SELECT RELATED ATTRIBUTE
S9
YES
CARRY OUT RELATED INFORMATION QUERY & REQUEST ATTRIBUTE VALUE INPUT
S10
ATTRIBUTE VALUE ASCERTAINED
S8
PRIORITY RECOGNITION PROCESSING
S12
CROSS-CHECK BETWEEN RELATED INFORMATION QUERY RESULT & ATTRIBUTE VALE RECOGNITION RESULT
S13
S14
YES
ATTRIBUTE VALUE CAN BE ASCERTAINED ONLY BY CONFIRMATION PROCESSING ?
NO

FIG.4

ATTRIBUTE VALUES OF ATTRIBUTE #1 (PREFECTURE)	ATTRIBUTE VALUES OF ATTRIBUTE #2 (CITY/TOWN)	ATTRIBUTE VALUES OF ATTRIBUTE #3 (SECTION)
TOKYO	MINATO	ROPPONGI
TOKYO	MINATO	AKASAKA
TOKYO	MINATO	SHIBA
TOKYO	MINATO	DAIBA
TOKYO	MINATO	- -
TOKYO	MINATO	- -
TOKYO	MINATO	- -
TOKYO	- -	- -
TOKYO	CHUOU	GINZA
TOKYO	CHUOU	NIHONBASHI
TOKYO	CHUOU	- -
TOKYO	- -	- -
TOKYO	CHIYODA	- -
TOKYO	CHIYODA	- -
TOKYO	- -	- -
TOKYO	SUGINAMI	- -
TOKYO	SUGINAMI	- -
TOKYO	- -	- -
KANAGAWA	YOKOHAMA	ISOGO
KANAGAWA	YOKOHAMA	KANAZAWA
KANAGAWA	- -	- -
KANAGAWA	YOKOSUKA	HIKARINOOKA
KANAGAWA	- -	NAGASAWA
KANAGAWA	CHIGASAKI	- -
	- -	- -

FIG.5

OUTPUT ORDER	ATTRIBUTE VALUE (CITY/TOWN) CANDIDATE	RECOGNITION LIKELIHOOD
1	AMAGASAKI	970
2	CHUOU	900
3	YOKKAICHI	820
4	CHIYODA	710
·	·	·
·	·	·
50	YOKOHAMA	·
·	·	·
·	·	·
100	YOKOSUKA	14

DESCENDING ORDER OF RECOGNITION LIKELIHOOD

FIG.6

OUTPUT ORDER	ATTRIBUTE VALUE (CITY/TOWN) CANDIDATE	RECOGNITION LIKELIHOOD
1	CHIGASAKI	1,200
2	TAKASAKI	1,050
3	TAKAMATU	980
4	AMAGASAKI	970
.	.	.
10	YOKKAICHI	820
.	.	.
500	YOKOHAMA	.
.	.	.
.	.	.
2100	NAHA	2

DESCENDING ORDER OF RECOGNITION LIKELIHOOD

CITY/TOWN CONTAINED IN NON-PRIORITZED RECOGNITION TARGET WORDS

FIG.7

OUTPUT ORDER	RELATED ATTRIBUTE VALUE CANDIDATE	RECOGNITION LIKELIHOOD
1	KAGAWA	1,020
2	KANAGAWA	1,000
3	ISHIKAWA	910
4	FUKUOKA	870
·	·	·
·	·	·
47	HOKKAIDO	34

DESCENDING ORDER OF RECOGNITION LIKELIHOOD

FIG.8

OUTPUT ORDER	ATTRIBUTE VALUE (CITY/TOWN) CANDIDATE	RECOGNITION LIKELIHOOD
1	CHIGASAKI	1,200
2	TAKASAKI	1,050
3	TAKAMATU	980
4	AMAGASAKI	970
.	.	.
10	YOKKAICHI	820
.	.	.
500	YOKOHAMA	.
.	.	.
.	.	.
2100	NAHA	2

ATTRIBUTE VALUE RECOGNITION RESULT (FIG.4)

OUTPUT ORDER	RELATED ATTRIBUTE VALUE CANDIDATE	RECOGNITION LIKELIHOOD
1	KAGAWA	1,020
2	KANAGAWA	1,000
3	ISHIKAWA	910
4	FUKUOKA	870
.	.	.
.	.	.
47	HOKKAIDO	34

RELATED ATTRIBUTE VALUE RECOGNITION RESULT (FIG.5)

OUTPUT ORDER	ATTRIBUTE VALUE (CITY/TOWN) CANDIDATE	CROSS-CHECKED LIKELIHOOD
1	CHIGASAKI,KANAGAWA	1,200,000
2	TAKAMATSU,KAGAWA	1,071,000
3	KANAZAWA,ISHIKAWA	999,800
4	.	.
.	.	.
10	TAKASAKI,GUNMA	640,100
.	.	.
.	.	.
.	.	.
2100	NAHA,OKINAWA	80

FIG.9

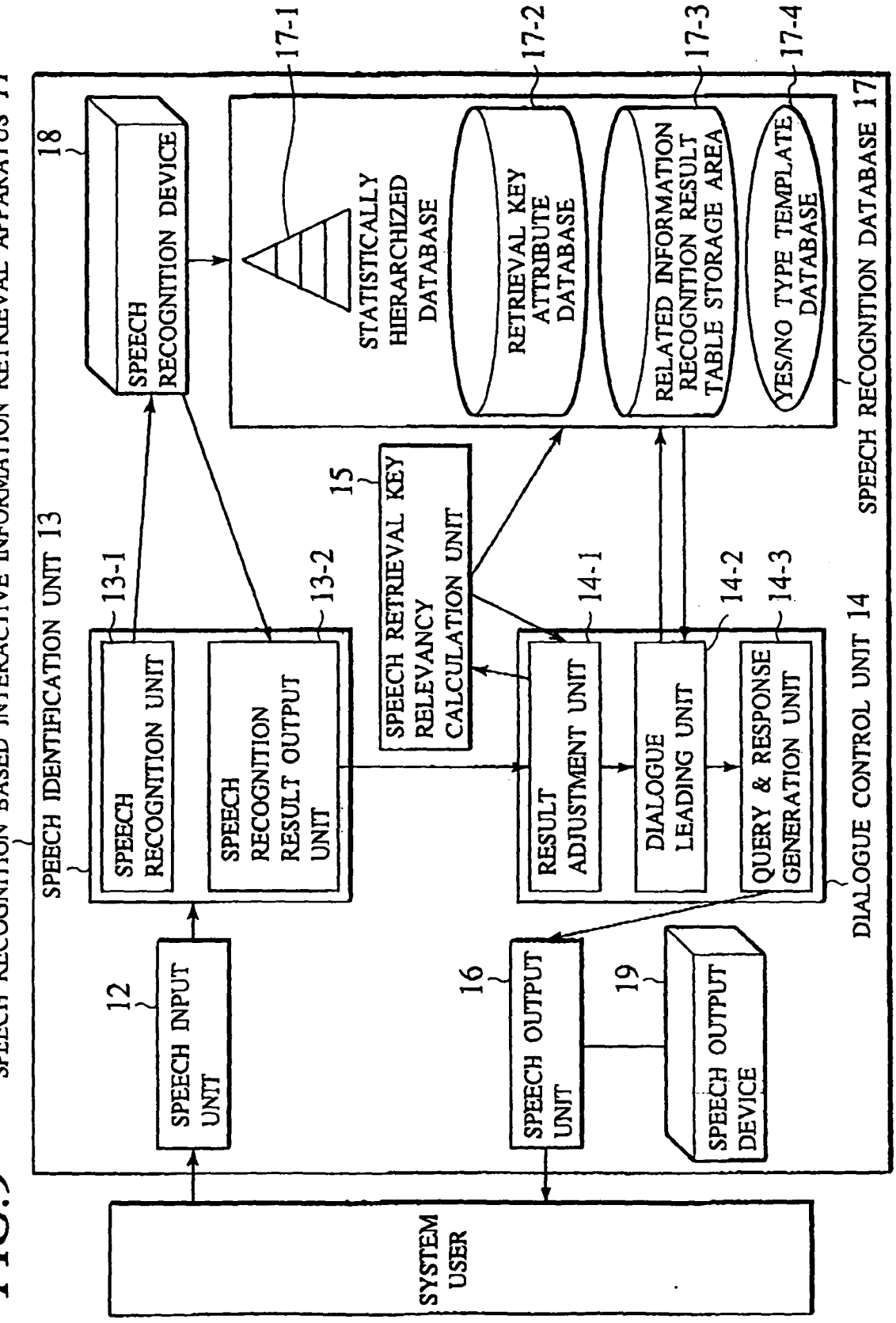

SPEECH RECOGNITION BASED INTERACTIVE INFORMATION RETRIEVAL APPARATUS 11
SPEECH IDENTIFICATION UNIT 13
SPEECH RECOGNITION UNIT
SPEECH RECOGNITION RESULT OUTPUT UNIT
13-1
13-2
SPEECH RETRIEVAL KEY RELEVANCY CALCULATION UNIT
15
DIALOGUE CONTROL UNIT 14
RESULT ADJUSTMENT UNIT
DIALOGUE LEADING UNIT
QUERY & RESPONSE GENERATION UNIT
14-1
14-2
14-3
SPEECH RECOGNITION DEVICE
18
SPEECH RECOGNITION DATABASE 17
STATISTICALLY HIERARCHIZED DATABASE
RETRIEVAL KEY ATTRIBUTE DATABASE
RELATED INFORMATION RECOGNITION RESULT TABLE STORAGE AREA
YES/NO TYPE TEMPLATE DATABASE
17-1
17-2
17-3
17-4
SPEECH INPUT UNIT
12
SPEECH OUTPUT UNIT
16
SPEECH OUTPUT DEVICE
19
SYSTEM USER

FIG.10

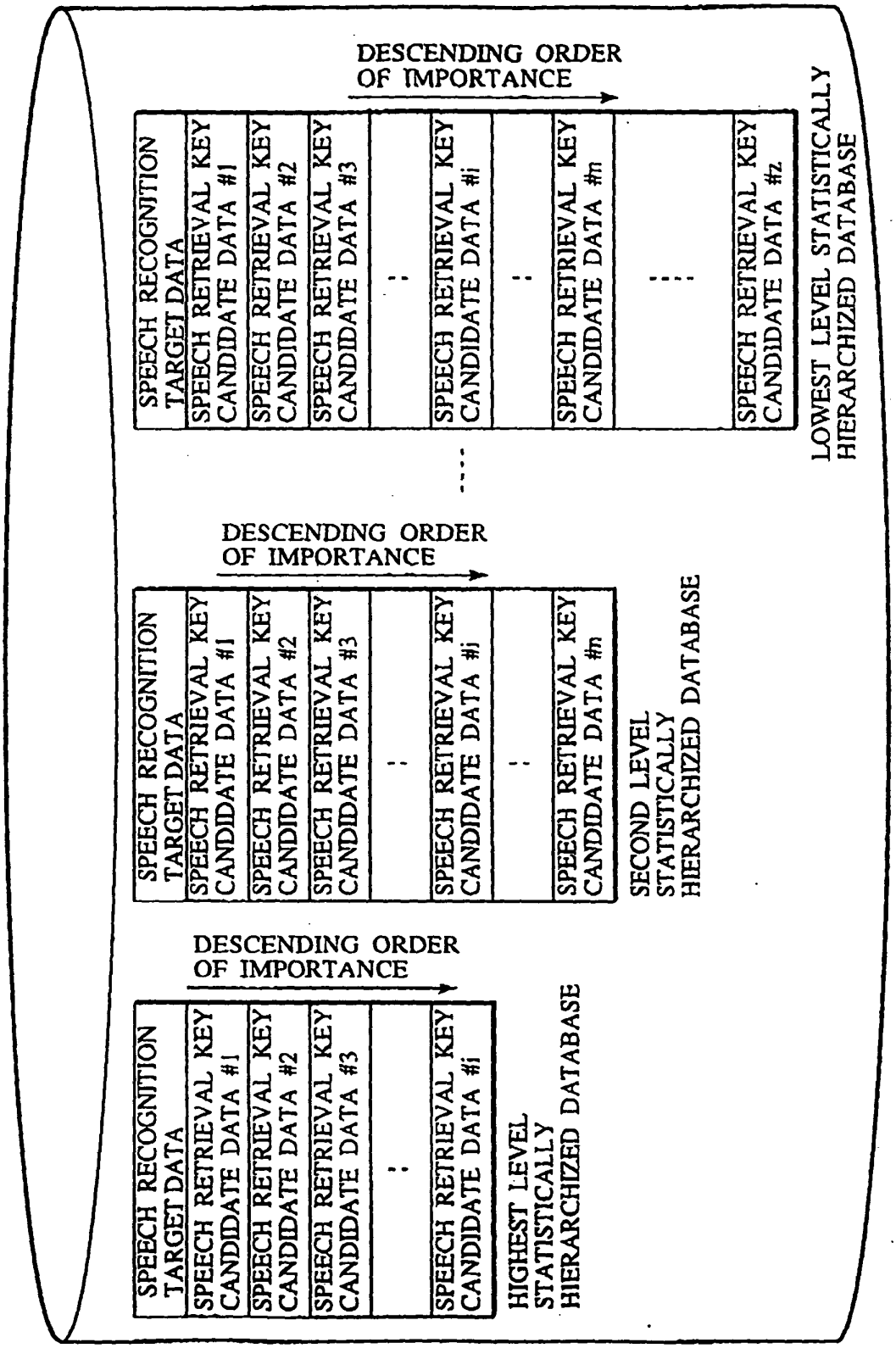
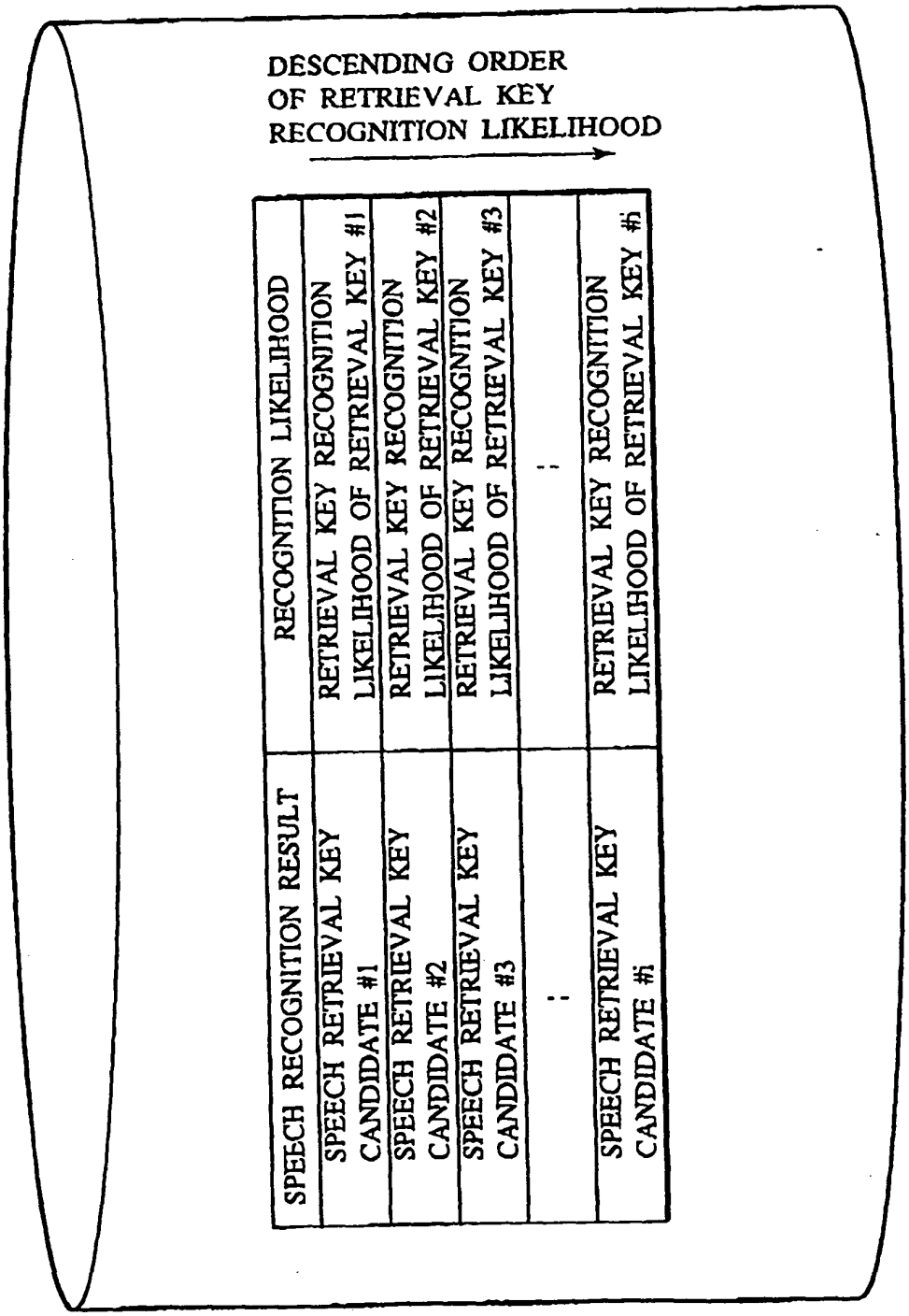
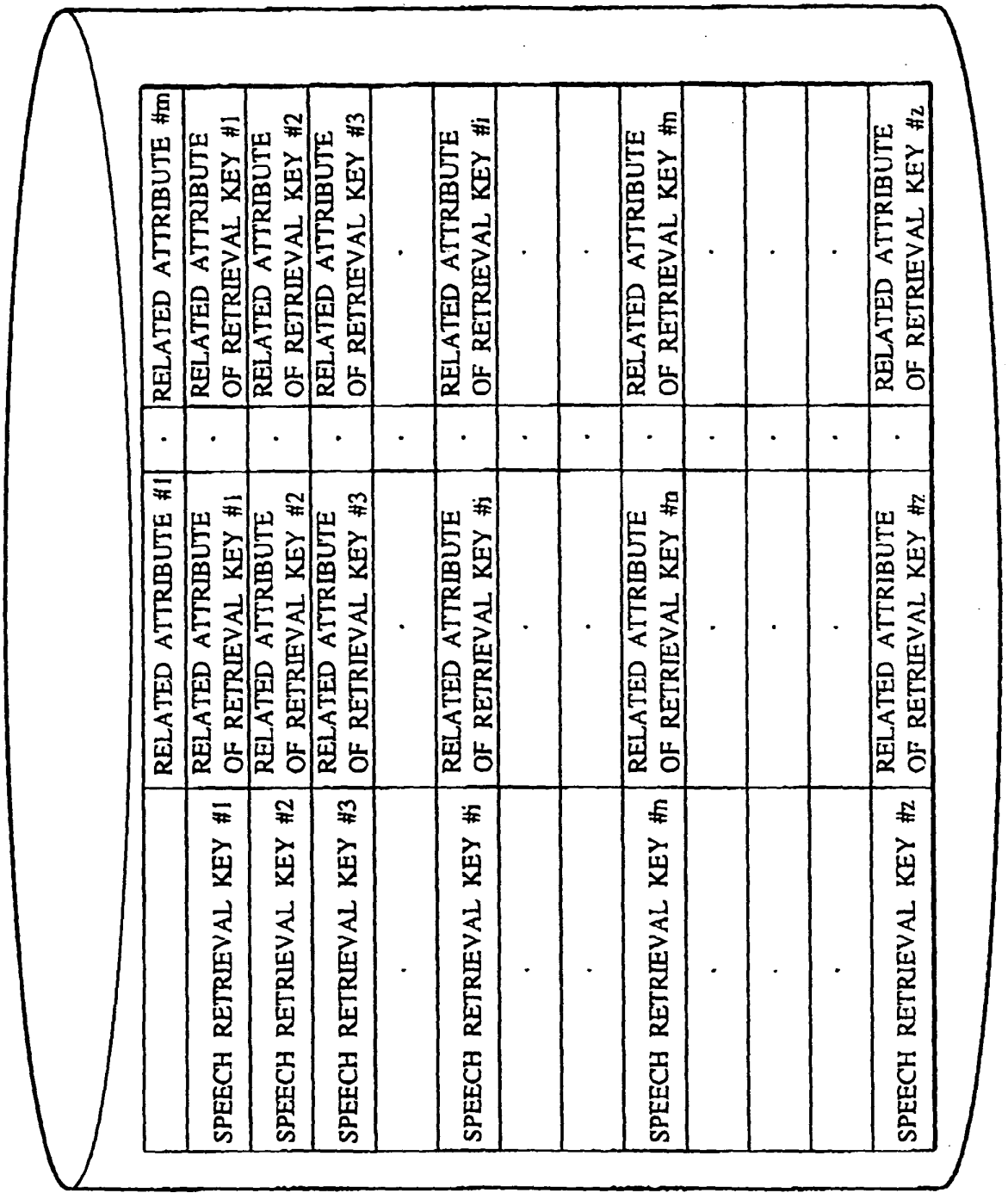

DESCENDING ORDER OF IMPORTANCE
SPEECH RECOGNITION TARGET DATA
SPEECH RETRIEVAL KEY CANDIDATE DATA #1
SPEECH RETRIEVAL KEY CANDIDATE DATA #2
SPEECH RETRIEVAL KEY CANDIDATE DATA #3
SPEECH RETRIEVAL KEY CANDIDATE DATA #i
SPEECH RETRIEVAL KEY CANDIDATE DATA #n
SPEECH RETRIEVAL KEY CANDIDATE DATA #z
LOWEST LEVEL STATISTICALLY HIERARCHIZED DATABASE
DESCENDING ORDER OF IMPORTANCE
SECOND LEVEL STATISTICALLY HIERARCHIZED DATABASE
DESCENDING ORDER OF IMPORTANCE
HIGHEST LEVEL STATISTICALLY HIERARCHIZED DATABASE

FIG.11


DESCENDING ORDER OF RETRIEVAL KEY RECOGNITION LIKELIHOOD
SPEECH RECOGNITION RESULT
RECOGNITION LIKELIHOOD
SPEECH RETRIEVAL KEY CANDIDATE #1
RETRIEVAL KEY RECOGNITION LIKELIHOOD OF RETRIEVAL KEY #1
SPEECH RETRIEVAL KEY CANDIDATE #2
RETRIEVAL KEY RECOGNITION LIKELIHOOD OF RETRIEVAL KEY #2
SPEECH RETRIEVAL KEY CANDIDATE #3
RETRIEVAL KEY RECOGNITION LIKELIHOOD OF RETRIEVAL KEY #3
SPEECH RETRIEVAL KEY CANDIDATE #ñ
RETRIEVAL KEY RECOGNITION LIKELIHOOD OF RETRIEVAL KEY #ñ



	RELATED ATTRIBUTE #1	.	RELATED ATTRIBUTE #m
SPEECH RETRIEVAL KEY #1	RELATED ATTRIBUTE OF RETRIEVAL KEY #1	.	RELATED ATTRIBUTE OF RETRIEVAL KEY #1
SPEECH RETRIEVAL KEY #2	RELATED ATTRIBUTE OF RETRIEVAL KEY #2	.	RELATED ATTRIBUTE OF RETRIEVAL KEY #2
SPEECH RETRIEVAL KEY #3	RELATED ATTRIBUTE OF RETRIEVAL KEY #3	.	RELATED ATTRIBUTE OF RETRIEVAL KEY #3
.	.	.	.
SPEECH RETRIEVAL KEY #i	RELATED ATTRIBUTE OF RETRIEVAL KEY #i	.	RELATED ATTRIBUTE OF RETRIEVAL KEY #i
.	.	.	.
.	.	.	.
SPEECH RETRIEVAL KEY #n	RELATED ATTRIBUTE OF RETRIEVAL KEY #n	.	RELATED ATTRIBUTE OF RETRIEVAL KEY #n
.	.	.	.
.	.	.	.
.	.	.	.
SPEECH RETRIEVAL KEY #z	RELATED ATTRIBUTE OF RETRIEVAL KEY #z	.	RELATED ATTRIBUTE OF RETRIEVAL KEY #z

FIG.12

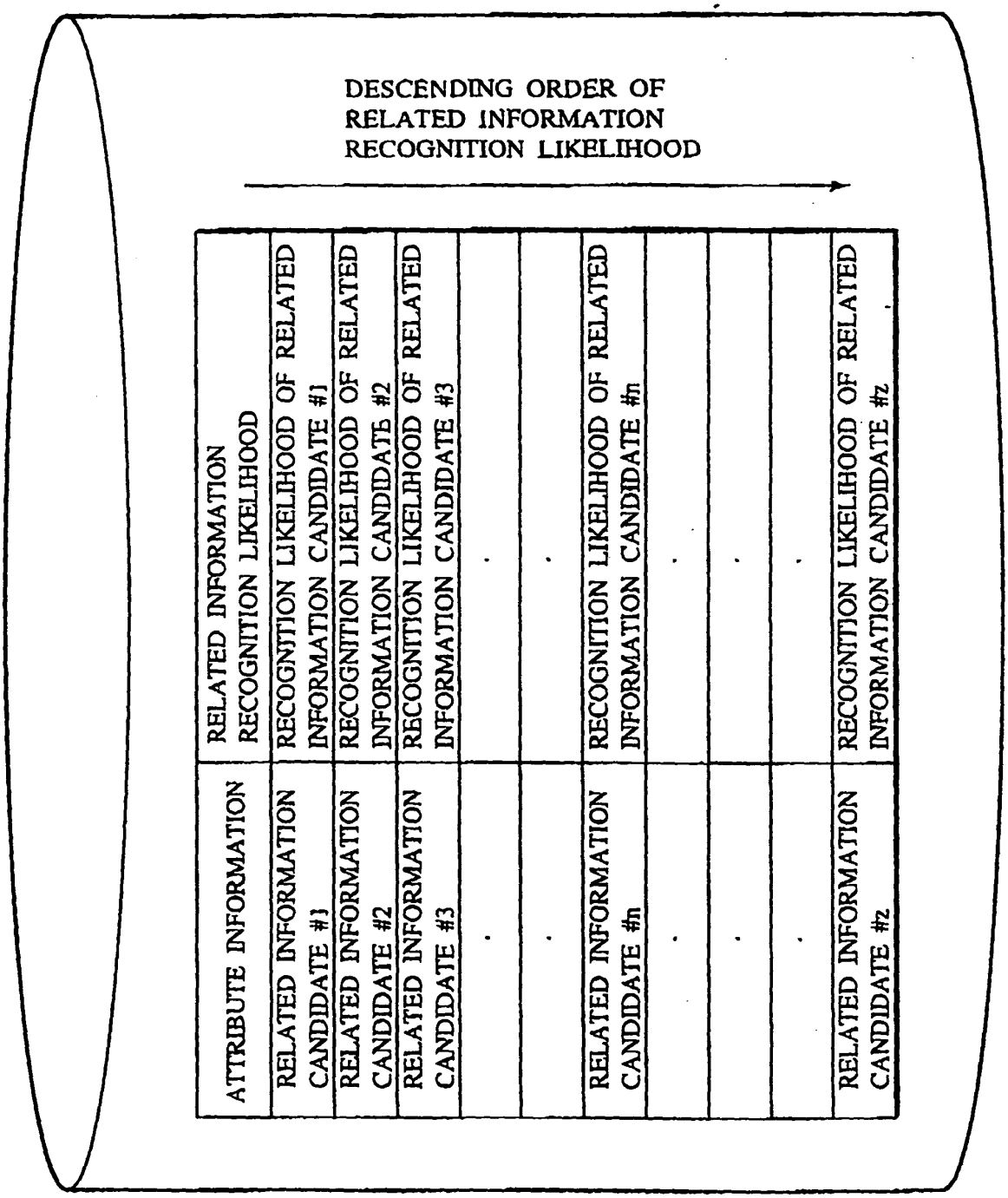

DESCENDING ORDER OF
RELATED INFORMATION
RECOGNITION LIKELIHOOD
ATTRIBUTE INFORMATION
RELATED INFORMATION RECOGNITION LIKELIHOOD
RELATED INFORMATION CANDIDATE #1
RECOGNITION LIKELIHOOD OF RELATED INFORMATION CANDIDATE #1
RELATED INFORMATION CANDIDATE #2
RECOGNITION LIKELIHOOD OF RELATED INFORMATION CANDIDATE #2
RELATED INFORMATION CANDIDATE #3
RECOGNITION LIKELIHOOD OF RELATED INFORMATION CANDIDATE #3
RELATED INFORMATION CANDIDATE #n
RECOGNITION LIKELIHOOD OF RELATED INFORMATION CANDIDATE #n
RELATED INFORMATION CANDIDATE #z
RECOGNITION LIKELIHOOD OF RELATED INFORMATION CANDIDATE #z

FIG.13

FIG.14

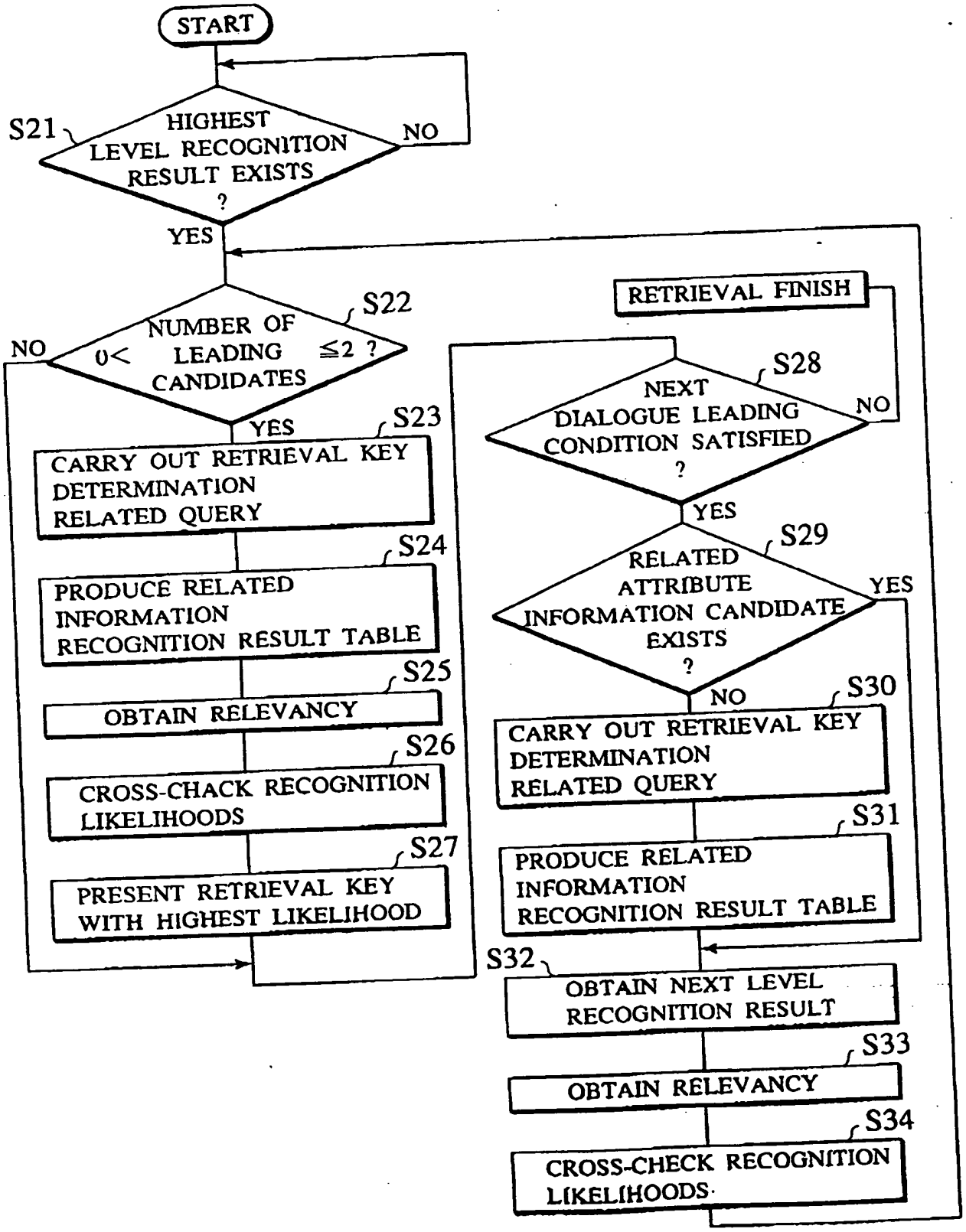

START
S21
HIGHEST LEVEL RECOGNITION RESULT EXISTS ?
NO
YES
S22
NUMBER OF LEADING CANDIDATES 0< ≦2 ?
NO
YES
S23
CARRY OUT RETRIEVAL KEY DETERMINATION RELATED QUERY
S24
PRODUCE RELATED INFORMATION RECOGNITION RESULT TABLE
S25
OBTAIN RELEVANCY
S26
CROSS-CHACK RECOGNITION LIKELIHOODS
S27
PRESENT RETRIEVAL KEY WITH HIGHEST LIKELIHOOD
RETRIEVAL FINISH
S28
NEXT DIALOGUE LEADING CONDITION SATISFIED ?
NO
YES
S29
RELATED ATTRIBUTE INFORMATION CANDIDATE EXISTS ?
YES
NO
S30
CARRY OUT RETRIEVAL KEY DETERMINATION RELATED QUERY
S31
PRODUCE RELATED INFORMATION RECOGNITION RESULT TABLE
S32
OBTAIN NEXT LEVEL RECOGNITION RESULT
S33
OBTAIN RELEVANCY
S34
CROSS-CHECK RECOGNITION LIKELIHOODS

FIG.15

	1ST LEVEL	2ND LEVEL	3RD LEVEL	4TH LEVEL
1	BERLIN PHILHARMONIC	BERLIN PHILHARMONIC	BERLIN PHILHARMONIC	BERLIN PHILHARMONIC
2	VIENNA PHILHARMONIC	VIENNA PHILHARMONIC	VIENNA PHILHARMONIC	VIENNA PHILHARMONIC
3	NEW YORK PHILHARMONIC	NEW YORK PHILHARMONIC	NEW YORK PHILHARMONIC	NEW YORK PHILHARMONIC
4	LONDON SYMPHONY	LONDON SYMPHONY	LONDON SYMPHONY	LONDON SYMPHONY
5	CHICAGO SYMPHONY	CHICAGO SYMPHONY	CHICAGO SYMPHONY	CHICAGO SYMPHONY
6	BOSTON SYMPHONY	BOSTON SYMPHONY	BOSTON SYMPHONY	BOSTON SYMPHONY
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
59	VIENNA STATE OPERA	VIENNA STATE OPERA	VIENNA STATE OPERA	VIENNA STATE OPERA
60	METROPOLITAN OPERA	METROPOLITAN OPERA	METROPOLITAN OPERA	METROPOLITAN OPERA
.		.	.	.
.		.	.	.
.		.	.	.
90		GUSTAV LEONHARDT	GUSTAV LEONHARDT	GUSTAV LEONHARDT
.		.	.	.
149		HESPERION XX	HESPERION XX	HESPERION XX
150		CONSORT OF MUSICKE	CONSORT OF MUSICKE	CONSORT OF MUSICKE
.			.	.
.			.	.
.			.	.
.			.	.
.			.	.
249			SEQUENTIA	SEQUENTIA
250			HUELGAS ENSEMBLE	HUELGAS ENSEMBLE
.				.
.				.
.				.
.				.
350				LONDON SINFONIETTA

FIG.16

	SPEECH RETRIEVAL KEY CANDIDATE	RECOGNITION LIKELIHOOD	NORMALIZED LIKELIHOOD
1	LONDON SYMPHONY	4,500	0.0375
2	BOSTON SYMPHONY	4,300	0.0358
3	NEW YORK PHILHARMONIC	3,900	0.0325
4	VIENNA STATE OPERA	3,700	0.0308
5	METROPOLITAN OPERA	3,700	0.0308
6	CHICAGO SYMPHONY	3,400	0.0283
.	.	.	.
.	.	.	.
60	PHILHARMONIA ORCHESTRA	1,600	0.0133
TOTAL		120,000	1.0000

DESCENDING ORDER OF RETRIEVAL KEY RECOGNITION LIKELIHOOD

FIG.17

	RETRIEVAL KEY CANDIDATE	DATE	PLACE	DAY OF WEEK	PREFECTURE	STYLE
1	BERLIN PHILHARMONIC	APRIL 12	OPERA CITY	MON	TOKYO	ORCHESTRA
2	VIENNA PHILHARMONIC	MAY 30	SYMPHONY HALL	SUN	OSAKA	ORCHESTRA
3	NEW YORK PHILHARMONIC	APRIL 3	OPERA CITY	SAT	TOKYO	ORCHESTRA
4	LONDON SYMPHONY	MAY 30	SYMPHONY HALL	SUN	OSAKA	ORCHESTRA
5	CHICAGO SYMPHONY	APRIL 20	SUNTORY HALL	TUE	TOKYO	ORCHESTRA
6	BOSTON SYMPHONY	APRIL 10	OPERA CITY	SAT	TOKYO	ORCHESTRA
.	.	.	.	.	.	.
.	.	.	.	.	.	.
59	VIENNA STATE OPERA	APRIL 20	NHK HALL	TUE	TOKYO	OPERA
60	METROPOLITAN OPERA	APRIL 21	NHK HALL	WED	TOKYO	OPERA
.	.	.	.	.	.	.
.	.	.	.	.	.	.
90	GUSTAV LEONHARDT	MARCH 3	CASALS HALL	WED	TOKYO	BAROQUE
.	.	.	.	.	.	.
149	HESPERION XX	MARCH 30	FESTIVAL HALL	TUE	OSAKA	BAROQUE
150	CONSORT OF MUSICKE	APRIL 10	SUNTORY HALL	SAT	TOKYO	BAROQUE
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
249	SEQUENTIA	APRIL 2	ORCHARD HALL	FRI	TOKYO	RENAISSANCE
250	HUELGAS ENSEMBLE	APRIL 21	TOKYO CATHEDRAL	WED	TOKYO	RENAISSANCE
.	.	.	.	.	.	.
.	.	.	.	.	.	.
350	LONDON SINFONIETTA	MARCH 3	FESTIVAL HALL	WED	OSAKA	CONTEMPORARY

FIG.18

	ATTRIBUTE INFORMATION CANDIDATE	RELATED INFORMATION LIKELIHOOD	NORMALIZED LIKELIHOOD
1	MARCH 5	5,600	0.0102
2	MARCH 10	5,400	0.0098
3	MARCH 4	4,800	0.0090
4	APRIL 10	4,400	0.0080
5	MARCH 3	4,200	0.0077
6	APRIL 3	3,500	0.0064
7	MARCH 30	3,000	0.0055
.	.	.	.
.	.	.	.
61	APRIL 20	1,100	0.0020
TOTAL		549,000	1.0000

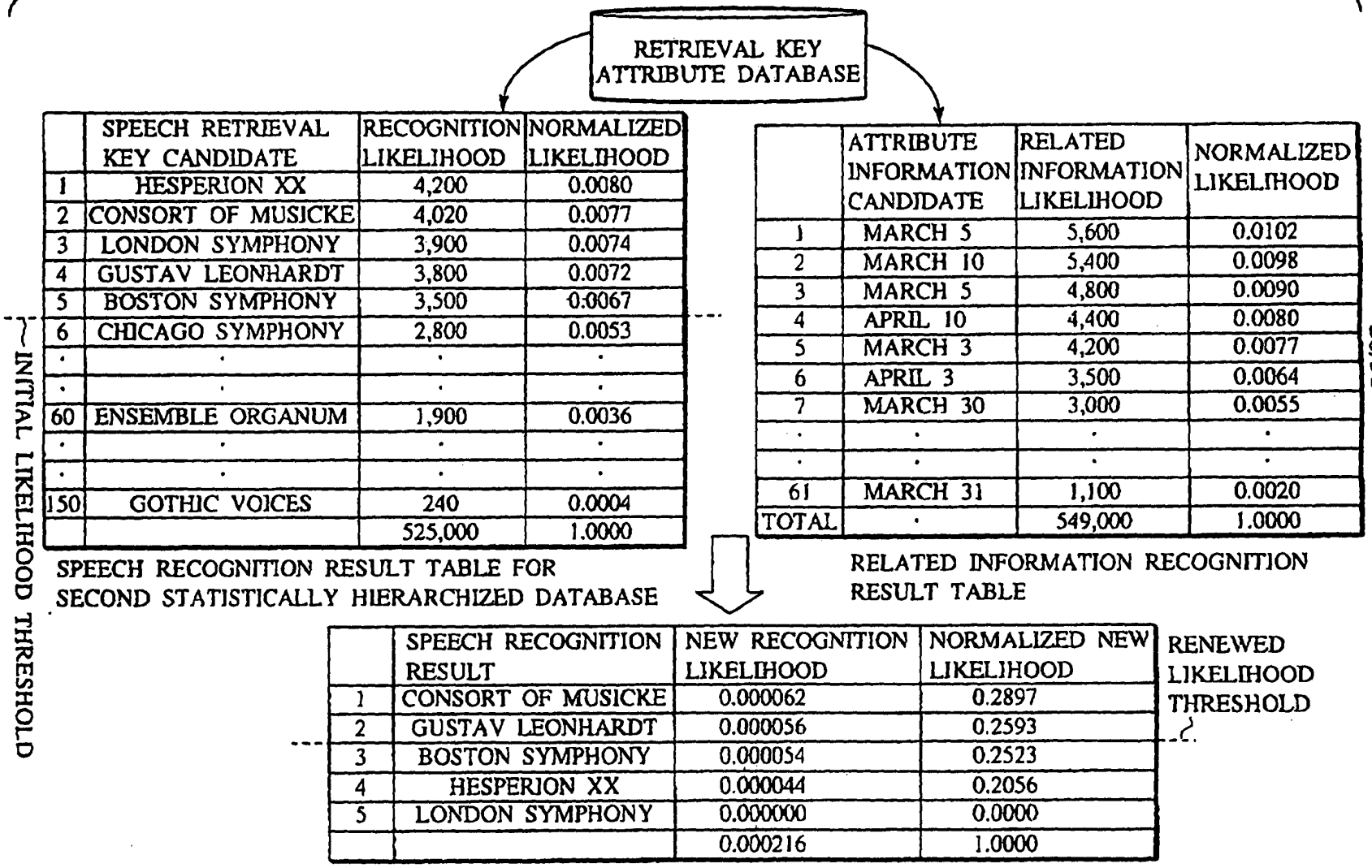
DESCENDING ORDER OF RELATED INFORMATION LIKELIHOOD

FIG.19

	SPEECH RETRIEVAL KEY CANDIDATE	RECOGNITION LIKELIHOOD	NORMALIZED LIKELIHOOD
1	HESPERION XX	4,200	0.0080
2	CONSORT OF MUSICKE	4,020	0.0077
3	LONDON SYMPHONY	3,900	0.0074
4	GUSTAV LEONHARDT	3,800	0.0072
5	BOSTON SYMPHONY	3,500	0.0067
6	CHICAGO SYMPHONY	2,800	0.0053
.	.	.	.
.	.	.	.
60	ENSEMBLE ORGANUM	1,900	0.0036
.	.	.	.
.	.	.	.
150	GOTHIC VOICES	240	0.0004
TOTAL		525,000	1.0000

DESCENDING ORDER OF RETRIEVAL KEY RECOGNITION LIKELIHOOD

FIG.20



Title: Speech Recognition Based Interactive Information Retrieval Scheme Using Dialogue Control to Reduce User Stress
Inventor: Kumiko Ohmori et al.

FIG.21

	ATTRIBUTE INFORMATION CANDIDATE	RELATED INFORMATION LIKELIHOOD	NORMALIZED LIKELIHOOD
1	CASALS HALL	4,200	0.0833
2	ORCHARD HALL	3,900	0.0774
3	FESTIVAL HALL	3,700	0.0734
4	SYMPHONY HALL	2,200	0.0436
5	NHK HALL	2,000	0.0397
6	SUNTORY HALL	2,000	0.0397
·	·	·	·
·	·	·	·
40	OPERA CITY	1,400	0.0278
TOTAL		50,400	1.0000

DESCENDING ORDER OF RELATED INFORMATION LIKELIHOOD

FIG.22

	SPEECH RECOGNITION RESULT	NEW RECOGNITION LIKELIHOOD	NORMALIZED NEW LIKELIHOOD
1	CONSORT OF MUSICKE	0.000062	0.2897
2	GUSTAV LEONHARDT	0.000056	0.2593
3	BOSTON SYMPHONY	0.000054	0.2523
4	HESPERION XX	0.000044	0.2056
5	LONDON SYMPHONY	0.000000	0.0000
		0.000216	1.0000

LIKELIHOOD THRESHOLD

RESULT OF CROSS-CHECKING SECOND LEVEL SPEECH RECOGNITION RESULT & CONCERT DATE

	ATTRIBUTE INFORMATION CANDIDATE	RELATED INFORMATION LIKELIHOOD	NORMALIZED LIKELIHOOD
1	CASALS HALL	4,200	0.0833
2	CRCHARD HALL	3,900	0.0774
3	FESTIVAL HALL	3,700	0 0734
4	SYMPHONY HALL	2,200	0.0436
5	NHK HALL	2,000	0.0397
6	SUNTORY HALL	2,000	0.0397
.	.	.	.
.	.	.	.
40	OPERA CITY	1,400	0.0278
		50,400	1.0000

PLACE AS RELATED INFORMATION RECOGNITION RESULT TABLE

RETRIEVAL KEY ATTRIBUTE DATABASE

	SPEECH RECOGNITION RESULT	NEW RECOGNITION LIKELIHOOD	NORMALIZED NEW LIKELIHOOD
1	GUSTAV LEONHARDT	0.02160	0.6123
2	CONSORT OF MUSICKE	0.01150	0.3260

Title: Speech Recognition Based Interactive Information Retrieval Scheme Using Dialogue Control to Reduce User Stress
Inventor: Kumiko Ohmori et al.

FIG.23

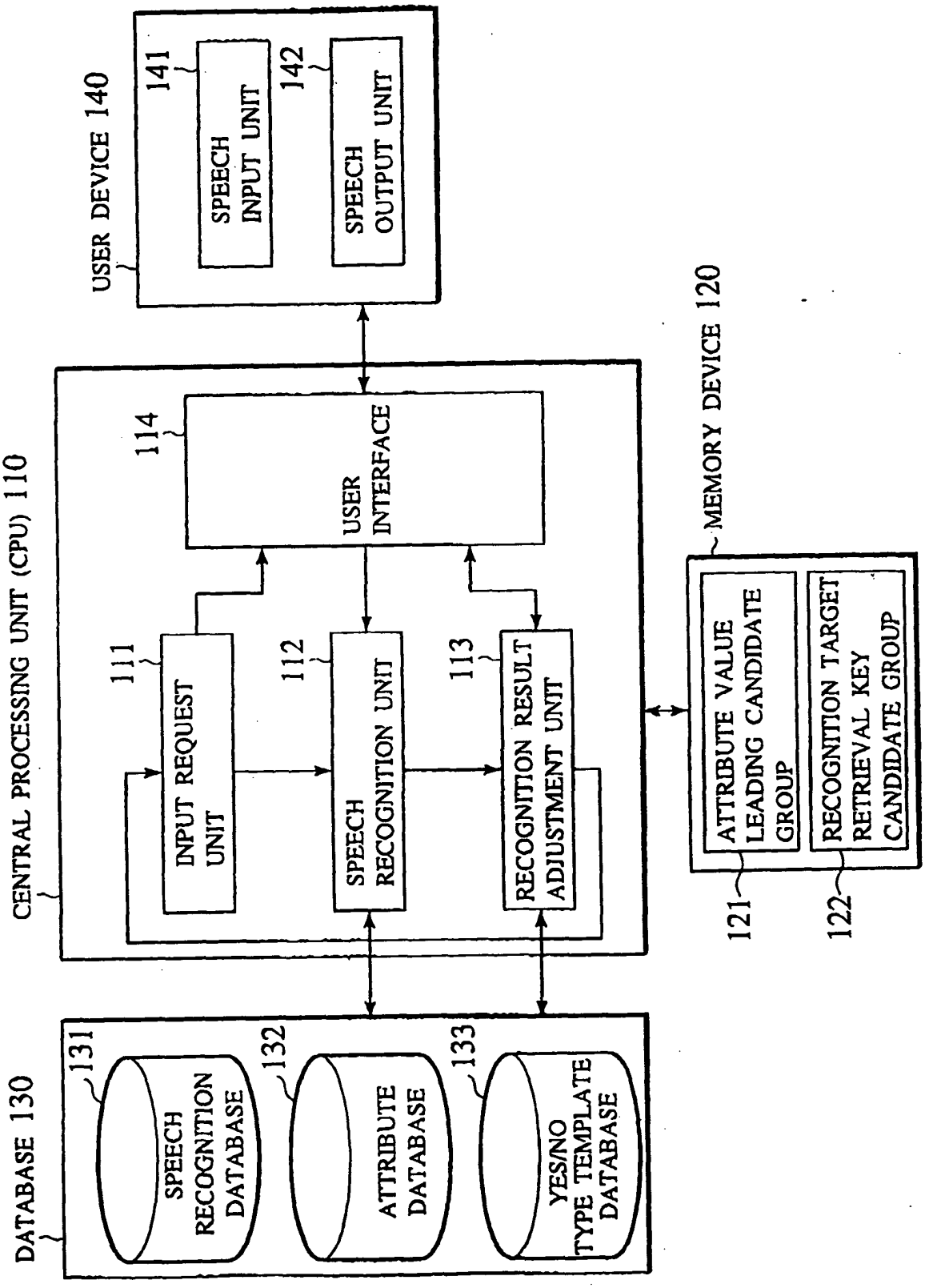

USER DEVICE 140
141
SPEECH INPUT UNIT
142
SPEECH OUTPUT UNIT
CENTRAL PROCESSING UNIT (CPU) 110
114
USER INTERFACE
111
INPUT REQUEST UNIT
112
SPEECH RECOGNITION UNIT
113
RECOGNITION RESULT ADJUSTMENT UNIT
MEMORY DEVICE 120
ATTRIBUTE VALUE LEADING CANDIDATE GROUP
RECOGNITION TARGET RETRIEVAL KEY CANDIDATE GROUP
121
122
DATABASE 130
131
SPEECH RECOGNITION DATABASE
132
ATTRIBUTE DATABASE
133
YES/NO TYPE TEMPLATE DATABASE

FIG.24

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RETRIEVAL KEY CANDIDATE	ATTRIBUTE ITEM #1	ATTRIBUTE ITEM #2	.	.	ATTRIBUTE ITEM #n
RETRIEVAL KEY #1	ATTRIBUTE VALUE #1-10	ATTRIBUTE VALUE #2-2	.	.	ATTRIBUTE VALUE #n-11
RETRIEVAL KEY #2	ATTRIBUTE VALUE #1-2	ATTRIBUTE VALUE #2-9	.	.	ATTRIBUTE VALUE #n-1
RETRIEVAL KEY #3	ATTRIBUTE VALUE #1-k	ATTRIBUTE VALUE #2-12	.	.	ATTRIBUTE VALUE #n-k
.	.	.	.	.	.
.	.	.	.	.	.
RETRIEVAL KEY #k	ATTRIBUTE VALUE #1-5	ATTRIBUTE VALUE #2-21	.	.	ATTRIBUTE VALUE #n-3

FIG.25

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ATTRIBUTE ITEM #1	ATTRIBUTE ITEM #2	.	.	ATTRIBUTE ITEM #n
ATTRIBUTE VALUE CANDIDATE #1-1	ATTRIBUTE VALUE CANDIDATE #2-1	.	.	ATTRIBUTE VALUE CANDIDATE #n-1
ATTRIBUTE VALUE CANDIDATE #1-2	ATTRIBUTE VALUE CANDIDATE #2-2	.	.	ATTRIBUTE VALUE CANDIDATE #n-2
ATTRIBUTE VALUE CANDIDATE #1-3	ATTRIBUTE VALUE CANDIDATE #2-3	.	.	ATTRIBUTE VALUE CANDIDATE #n-3
.	.	.	.	.
.	.	.	.	.
ATTRIBUTE VALUE CANDIDATE #1-k	ATTRIBUTE VALUE CANDIDATE #2-k	.	.	ATTRIBUTE VALUE CANDIDATE #n-k

FIG.26

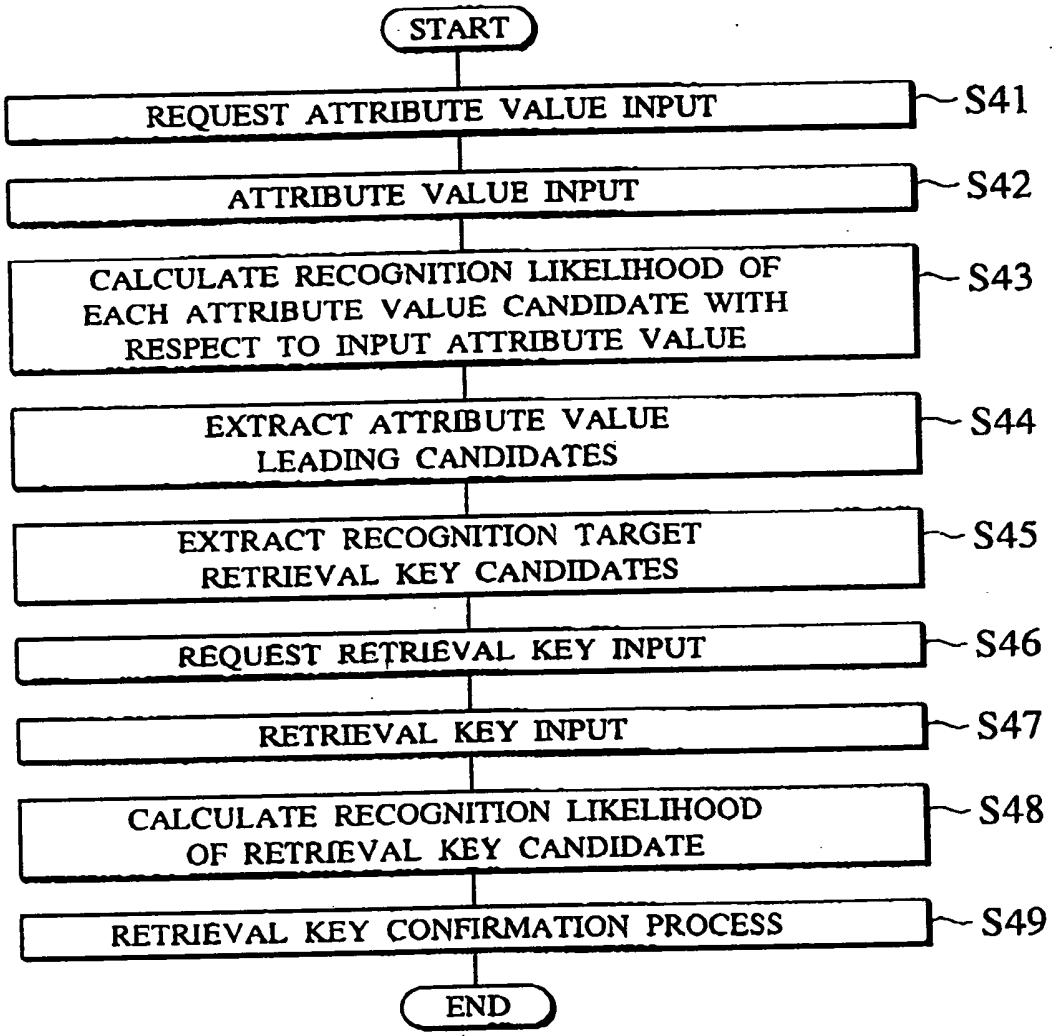
START
REQUEST ATTRIBUTE VALUE INPUT
S41
ATTRIBUTE VALUE INPUT
S42
CALCULATE RECOGNITION LIKELIHOOD OF EACH ATTRIBUTE VALUE CANDIDATE WITH RESPECT TO INPUT ATTRIBUTE VALUE
S43
EXTRACT ATTRIBUTE VALUE LEADING CANDIDATES
S44
EXTRACT RECOGNITION TARGET RETRIEVAL KEY CANDIDATES
S45
REQUEST RETRIEVAL KEY INPUT
S46
RETRIEVAL KEY INPUT
S47
CALCULATE RECOGNITION LIKELIHOOD OF RETRIEVAL KEY CANDIDATE
S48
RETRIEVAL KEY CONFIRMATION PROCESS
S49
END

FIG.27

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RETRIEVAL KEY CANDIDATE	PREFECTURE	DISTRICT	·	·	SEASIDE OR NOT
SAPPORO	HOKKAIDO	HOKKAIDO	·	·	NO
ASAHIKAWA	HOKKAIDO	HOKKAIDO	·	·	YES
·	·	·	·	·	·
YOKOHAMA	KANAGAWA	KANTO	·	·	YES
·	·	·	·	·	·
NAHA	OKINAWA	KYUSHU	·	·	YES

FIG.28

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PREFECTURE	DISTRICT	·	·	SEASIDE OR NOT	
HOKKAIDO	HOKKAIDO	·	·	YES	
AOMORI	TOHOKU	·	·	NO	
AKITA	KANTO	·	·		
·	TOKAI	·	·		
KANAGAWA	KINKI	·	·		
TOKYO	HOKURIKU	·	·		
·	SANIN				
·	SHIKOKU				

FIG.29

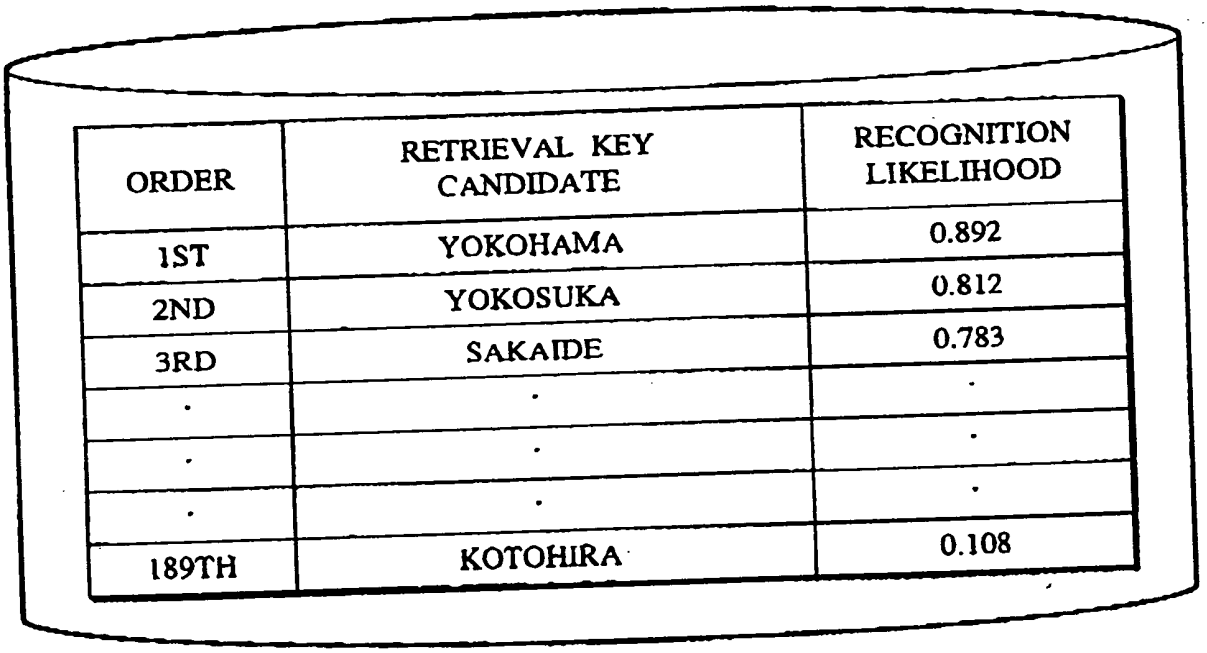
ORDER	ATTRIBUTE VALUE CANDIDATE	RECOGNITION LIKELIHOOD
1ST	KAGAWA	0.945
2ND	KANAGAWA	0.899
3RD	ISHIKAWA	0.783
·	·	·
·	·	·
·	·	·
47TH	FUKUI	0.212

FIG.30

RECOGNITION TARGET CITY/TOWN	ATTRIBUTE VALUE
YOKOHAMA	KANAGAWA
YOKOSUKA	KANAGAWA
KAWASAKI	KANAGAWA
KAMAKURA	KANAGAWA
·	KANAGAWA
·	·
·	·
·	·
KAGAWA	KAGAWA
TAKAMATSU	KAGAWA
SAKAIDE	KAGAWA
KOTOHIRA	KAGAWA
·	·

189 RETRIEVAL KEY CANDIDATES SELECTED

FIG.31



ORDER	RETRIEVAL KEY CANDIDATE	RECOGNITION LIKELIHOOD
1ST	YOKOHAMA	0.892
2ND	YOKOSUKA	0.812
3RD	SAKAIDE	0.783
·	·	·
·	·	·
·	·	·
189TH	KOTOHIRA	0.108

FIG.32

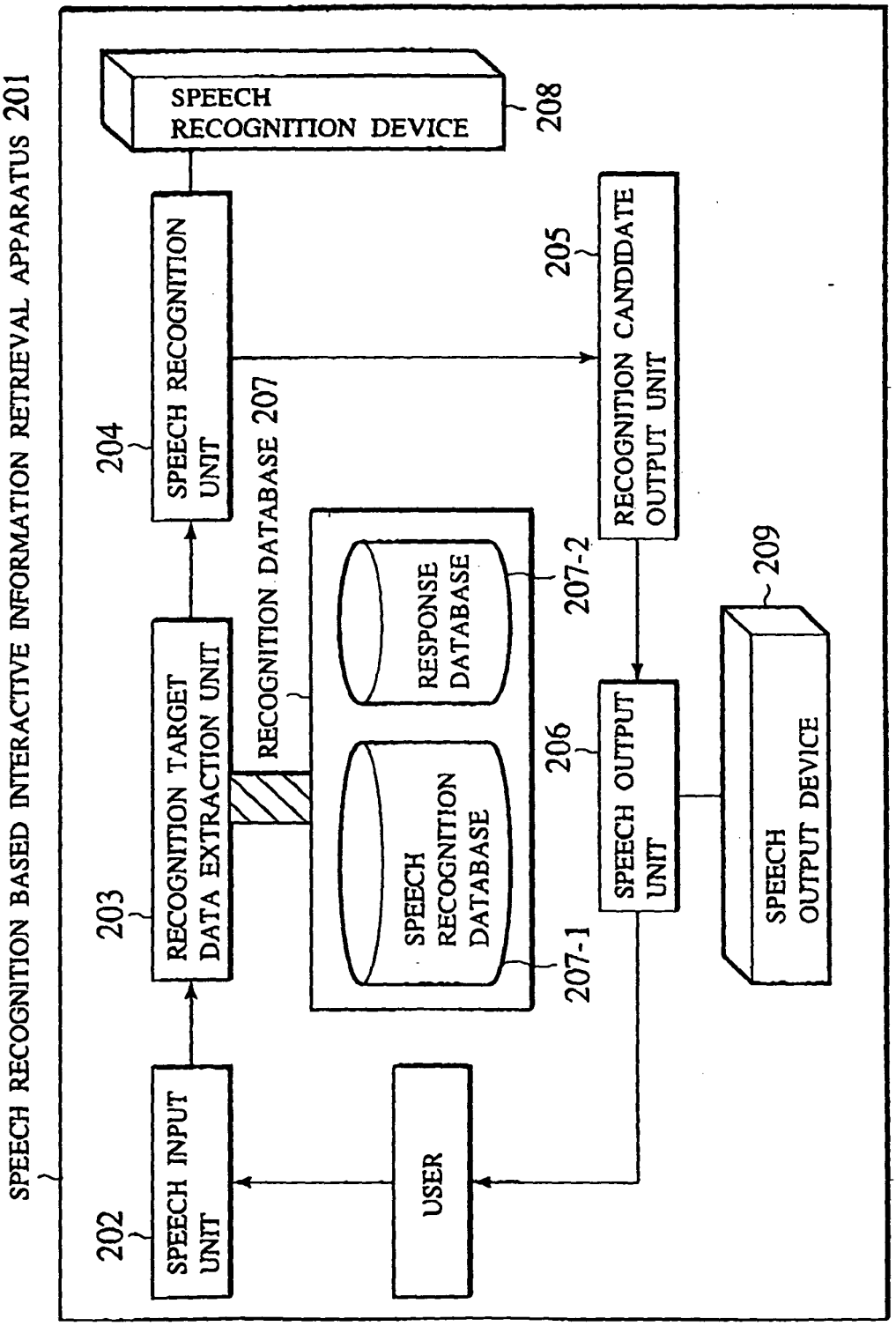

SPEECH RECOGNITION BASED INTERACTIVE INFORMATION RETRIEVAL APPARATUS 201
SPEECH RECOGNITION DEVICE
208
SPEECH RECOGNITION UNIT
204
RECOGNITION CANDIDATE OUTPUT UNIT
205
RECOGNITION TARGET DATA EXTRACTION UNIT
203
RECOGNITION DATABASE 207
RESPONSE DATABASE
207-2
SPEECH RECOGNITION DATABASE
207-1
SPEECH OUTPUT UNIT
206
SPEECH OUTPUT DEVICE
209
SPEECH INPUT UNIT
202
USER

FIG.33

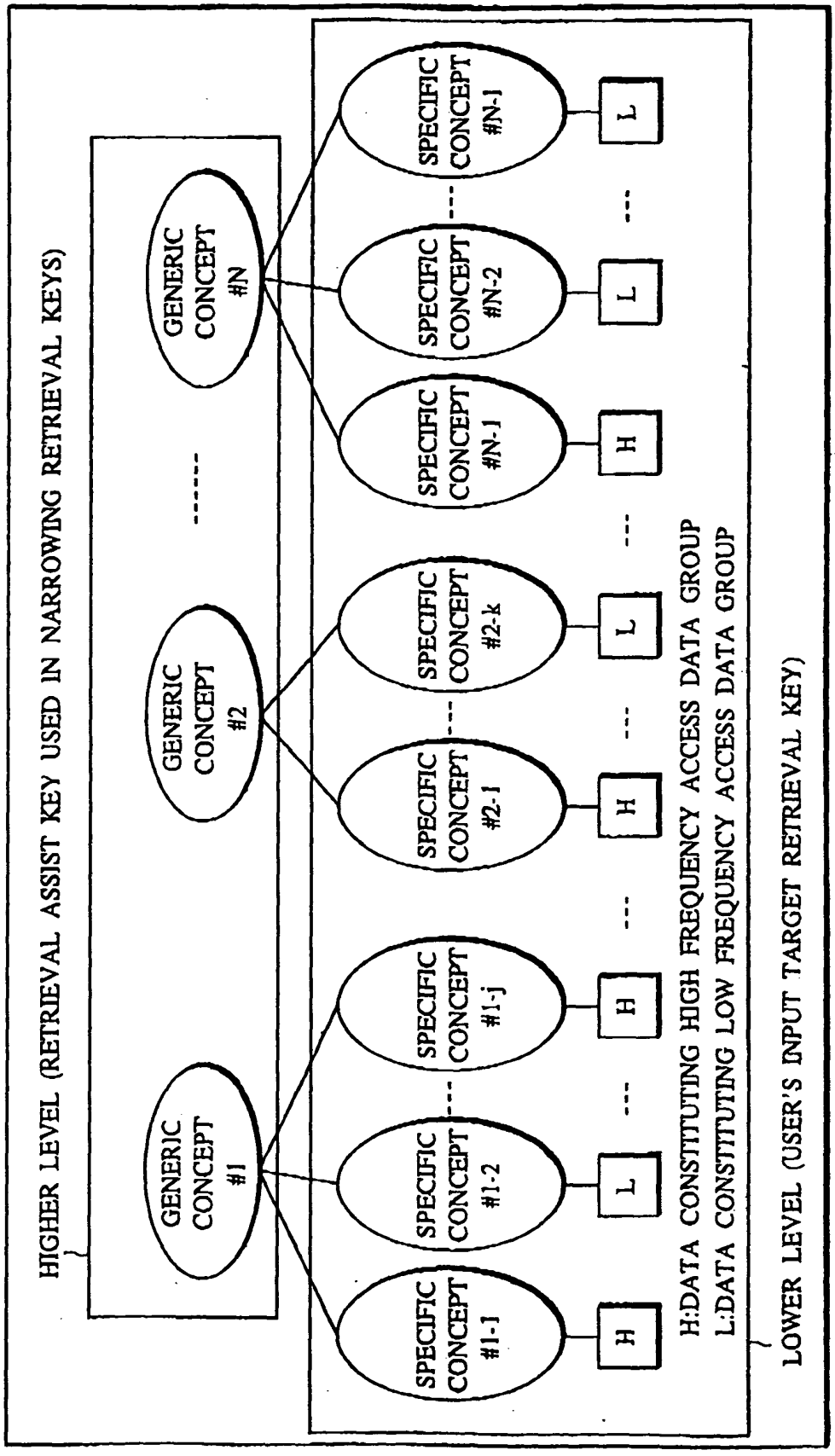

HIGHER LEVEL (RETRIEVAL ASSIST KEY USED IN NARROWING RETRIEVAL KEYS)
GENERIC CONCEPT #1
GENERIC CONCEPT #2
GENERIC CONCEPT #N
SPECIFIC CONCEPT #1-1
SPECIFIC CONCEPT #1-2
SPECIFIC CONCEPT #1-j
SPECIFIC CONCEPT #2-1
SPECIFIC CONCEPT #2-k
SPECIFIC CONCEPT #N-1
SPECIFIC CONCEPT #N-2
SPECIFIC CONCEPT #N-1
H
L
H:DATA CONSTITUTING HIGH FREQUENCY ACCESS DATA GROUP
L:DATA CONSTITUTING LOW FREQUENCY ACCESS DATA GROUP
LOWER LEVEL (USER'S INPUT TARGET RETRIEVAL KEY)

FIG.34

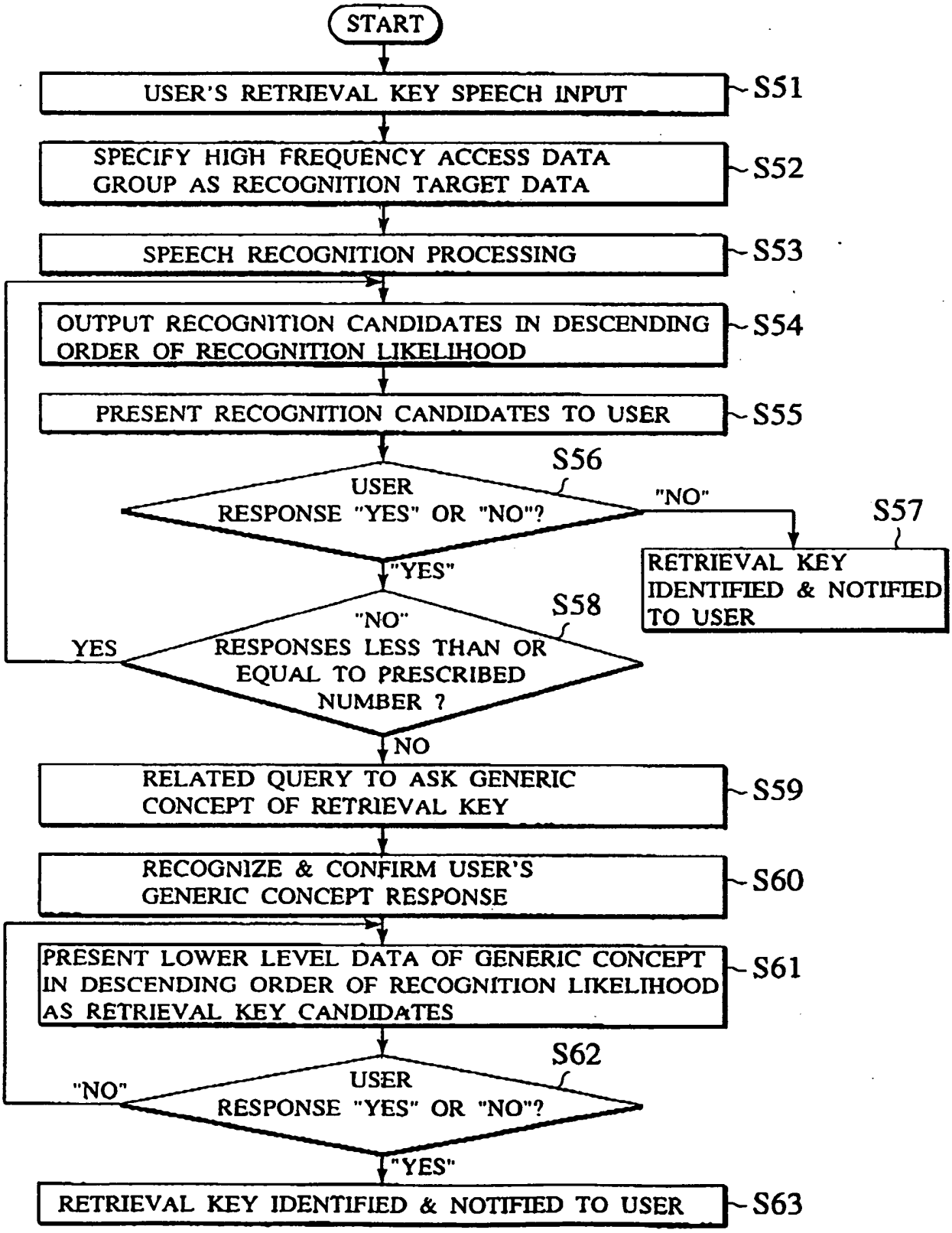

START
USER'S RETRIEVAL KEY SPEECH INPUT
S51
SPECIFY HIGH FREQUENCY ACCESS DATA GROUP AS RECOGNITION TARGET DATA
S52
SPEECH RECOGNITION PROCESSING
S53
OUTPUT RECOGNITION CANDIDATES IN DESCENDING ORDER OF RECOGNITION LIKELIHOOD
S54
PRESENT RECOGNITION CANDIDATES TO USER
S55
S56
USER RESPONSE "YES" OR "NO"?
"NO"
S57
RETRIEVAL KEY IDENTIFIED & NOTIFIED TO USER
"YES"
S58
"NO" RESPONSES LESS THAN OR EQUAL TO PRESCRIBED NUMBER ?
YES
NO
RELATED QUERY TO ASK GENERIC CONCEPT OF RETRIEVAL KEY
S59
RECOGNIZE & CONFIRM USER'S GENERIC CONCEPT RESPONSE
S60
PRESENT LOWER LEVEL DATA OF GENERIC CONCEPT IN DESCENDING ORDER OF RECOGNITION LIKELIHOOD AS RETRIEVAL KEY CANDIDATES
S61
S62
USER RESPONSE "YES" OR "NO"?
"NO"
"YES"
RETRIEVAL KEY IDENTIFIED & NOTIFIED TO USER
S63

FIG.35

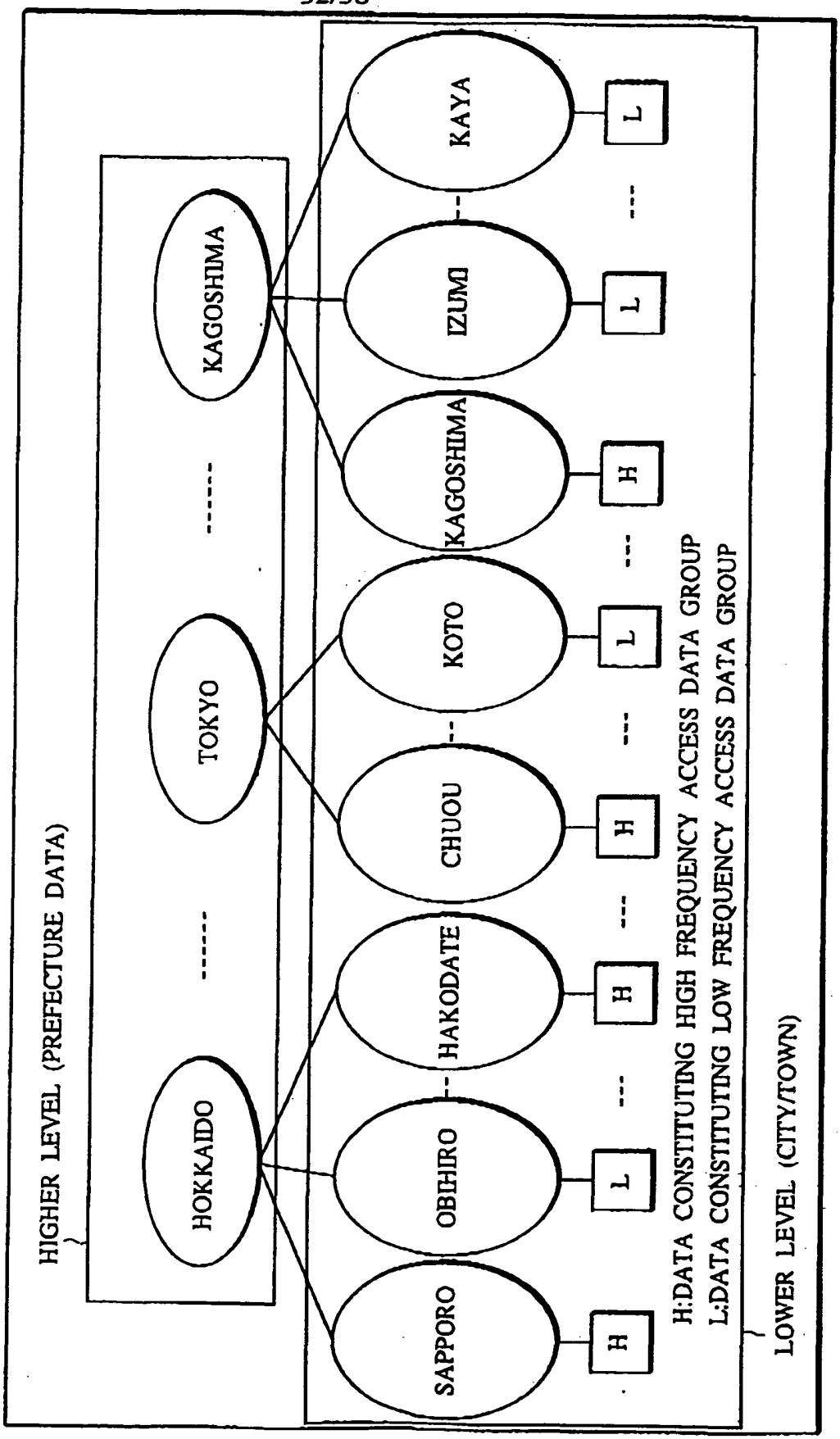

HIGHER LEVEL (PREFECTURE DATA)
HOKKAIDO
TOKYO
KAGOSHIMA
SAPPORO
OBIHIRO
HAKODATE
CHUOU
KOTO
KAGOSHIMA
IZUMI
KAYA
H
L
H:DATA CONSTITUTING HIGH FREQUENCY ACCESS DATA GROUP
L:DATA CONSTITUTING LOW FREQUENCY ACCESS DATA GROUP
LOWER LEVEL (CITY/TOWN)

FIG.36

ACCESS FREQUENCY	CITY/TOWN
1ST	MINATO
2ND	CHUOU
3RD	SHIBUYA
4TH	YOKOHAMA
5TH	SHINJUKU
.	.
.	.
49TH	OSAKA
50TH	MAIHAMA

DESCENDING ORDER OF ACCESS FREQUENCY

FIG.37

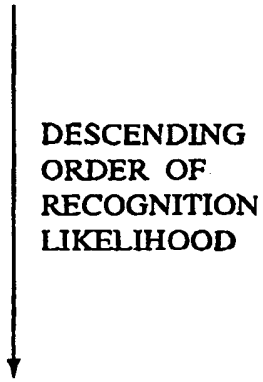
ORDER	CITY/TOWN
1ST	YOKOSUKA
2ND	YOKOHAMA
3RD	YOTSUGI
4TH	MAIHAMA
·	·
·	·
50TH	MINATO

DESCENDING ORDER OF RECOGNITION LIKELIHOOD

FIG.38

ORDER	CITY/TOWN
1ST	YOKOHAMA
2ND	YOKOSUKA
3RD	YOKOYAMA
4TH	MIHAMA
.	.
.	.
50TH	CHIBA

DESCENDING ORDER OF RECOGNITION LIKELIHOOD

FIG.39

ORDER	CITY/TOWN
1ST	YOKOKAWA
2ND	TAKASAKI
3RD	MAEHASHI
.	.
.	.
.	.
41TH	KIRYU